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6 August 1970

MEMORANDUM FOR THE RECORD

SUBJECT: Costs and Benefits of VIATRON for GICS and other Applications

1. In deciding whether source data automation with VIATRON equipment is or is not economically advantageous, we can employ a figure that might be called the break-even level. This is the level of production for one analyst at which the cost of inputting with VIATRON just equals the cost of inputting the same data through conventional, i.e., keypunch and verifier, methods. A derivation of the break-even level is the subject of the following paragraphs. Although the same technique could be used on any application, the application studied here is GICS.

2. To derive the break-even level we make use of a series of assumptions, as follows:

a. Each analyst must have the exclusive use of one VIATRON; sharing of one machine by two or more analysts will unduly hamper efficiency.

b. Any analyst can be trained to input into a VIATRON with roughly the same speed as he or she can write the same information onto a coding sheet.

c. The monthly cost of a VIATRON can be thought of as one forty-eighth of its purchase price, plus the monthly maintenance charge.

d. The VIATRON that we are talking about above is the 2111 Microprocessor without peripherals such as the printing robot or the card punch adapter. The price of the 2111 since 1 July has been \$4272.00, according to Don McCullough, our local VIATRON dealer.

e. One forty-eighth of that figure is \$89.00 per month. The monthly maintenance charge (according to Don McCullough) is one-half of one percent of the purchase price, of \$21.36. Thus the cost to us per month for a single VIATRON is the sum of those two figures, or \$110.36 per month.

f. Source data input via VIATRON by analysts will not require machine verification.

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g. Conventional, i.e., key-punched, input will continue to require machine verification.

h. Average output for a keypunch operator working on GICS records is 159 records per hour. (Source: ADP Accounting for Fiscal Year 1970).

i. Average salary for a keypunch operator is \$2.80 per hour, (Source: SG Memo 70/262 dated 30 July 1970).

j. Thus the cost of labor for key-punching one record of the GICS type is \$.018.

k. And, by the same calculating method, the cost of labor for verifying a single GICS record is \$.012.

l. The machine cost of keypunching and verifying a record is \$.0068. This figure is obtained by dividing total machine costs (i.e., rentals for fifteen 029 keypunches and nine 059 verifiers) for FY 1970 into total production during the same period. (Sources: ADP Accounting for FY 1970, [REDACTED] and IBM rental schedule for 1970).

m. Therefore, total cost for machines and labor for keypunching and verifying one record of the GICS type is the sum of the unit costs calculated in sub-paragraphs j, k, and l, above, or \$.0368 per record.

3. If we accept all of the assumptions set out above, then we can calculate the break-even production level for the VIATRON. It is the monthly cost (\$110.36) divided by the cost per record of conventional keypunching and verifying (\$.0368), or almost exactly 3000 records per month.

4. What is the production rate of a GICS analyst? Two figures, varying by a considerable amount, have been estimated recently. While obtained through "ball park" methods, they are nevertheless worth noting.

a. Based on statistics on file in [REDACTED] total of 204,635 cards (i.e., records) were produced in FY 1969 with an expenditure of 5.68 man-years of effort. Reducing the man-year figure by one to account for administrative and overhead time not spent directly on production of GICS records, we allocate 4.68 man-years to production. Dividing the output by this number gives an annual production per full-time analyst of 43,725 records, or a monthly production of 3644 records.

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b. In a study of the [redacted] program alone, [redacted] estimates that the typical [redacted] analyst completes 65 GICS forms per day, each form having an average of five lines (i.e., records) filled in. This rate gives a daily production of 325 lines, and if we allot 22 working days to a month, the monthly production on the average is 7150 records.

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5. In either case, production is well above the break-even level. But that level was based on certain assumptions. What happens when we modify one or more of them? First, we might see how the break-even level would be affected by a rise in IBM's monthly rentals on the 029's and 059's. Such an increase is due shortly, according to Don Williams. The rental on the 029 goes up from \$67.00 to \$77.00, and that on the 059 from \$70.00 to \$85.00. The increase in the break-even level turns out to be slight, however; it drops by only 3% or so, to 2907 records per month.

6. How about the assumption that the analyst can produce either written coding sheets or VIATAPEs with equal speed? It might be argued that since the VIATAPE input will not be verified (another assumption, paragraph 2 f), the analyst will be obliged to spend extra time sight-checking his VIATAPE input. If the added time required for checking reduces his input rate by, say 20%, and if we estimate his "pencil rate" at 3644 (par. 4 a), then his VIATAPE rate will fall below the 3000 records per month that he needs to break even. Although no test of short duration will prove or disprove the assumption that analysts can achieve a VIATAPE rate to match their pencil rate, my guess is that a drop of as much as 20% is unlikely. Note that as long as the two rates are roughly comparable, the cost of the analyst's time does not affect the break-even level.

7. Is the method of figuring monthly VIATRON costs (paragraphs 2 c through 2 e) a valid one? There may be good arguments in favor of pro-rating the purchase price over a longer or a shorter period. I have chosen 48 months because that was the formula used by the VIATRON people themselves in the old days when they talked about both renting and selling their equipment.

8. The foregoing analysis of the break-even level takes no account of certain factors that must figure in the decision to convert to VIATRON or not to convert. Among these factors are availability of space, the problems caused by elimination of hardcopy temporary records, and numerous human factors. Even acknowledging those omissions, however, we may still find the break-even level a convenient aid in planning.

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